

Functionalized Nano-Film Microchannel Plate: A Single High Aspect Ratio Device for High Resolution, Low Noise Astronomical Imaging, Phase I

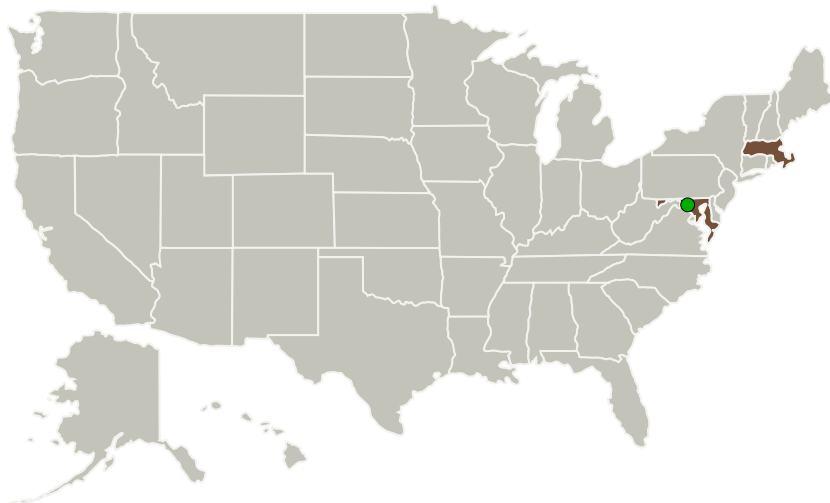
Completed Technology Project (2010 - 2010)



Project Introduction

The proposed innovation is to apply proven nano-film technology to enable Microchannel plate (MCP) devices to be manufactured on a range of insulating substrates and devices which possess sufficiently high gain and low ion feedback to replace chevron stacks in current NASA detector technologies. Commercial MCP devices have many desirable properties, such as sensitivity to small amounts of light and excellent position and timing resolution. MCP production is a mature technology, based largely on techniques and materials developed in the 1970's, and is limited to small area devices. Limitations due to the bulk glass manufacturing technology adversely impact many applications and impair manufacturability. For example, heavy metal impurities contained within the bulk glass of the MCP limit the achievable dark noise in low signal detection. In MCP manufacturing, the requisite batch processing restricts flexibility to tailor individual device or small batch performance to specific applications and can often result in poor MCP yield due to variations in composition and poor process control. In this proposal, we will utilize atomic layer deposition (ALD) of nanometer thin films which has been proven to replicate and improve the component functions of secondary electron emission (SEE) and conductivity on non-traditional glass substrates, to investigate the high gain and low ion feedback capabilities of this technology. We estimate that the technology stands at TRL 2 at the and expect to be at 4 at end of the Phase 1 contract.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Arradance, Inc.	Lead Organization	Industry	Sudbury, Massachusetts
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Massachusetts

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139998>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Arradance, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

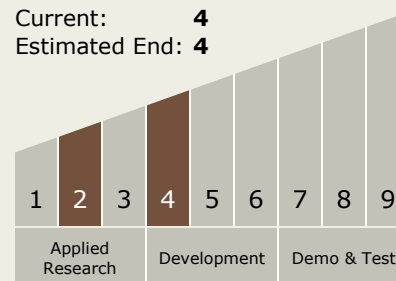
Carlos Torrez

Principal Investigator:

Neal Sullivan

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System